



First of all, after charging the capacitor to the supply voltage, increasing  $V_{ref}$  linearly to start converter softly.

From 200V boost to 400V, the power of inverter is 2 kW. The frequency of Switch is 2.7 kHz.  $G_v(s)$  and  $G_d(s)$  are PI controllers.  $G_s(s)$  is a notch filter controller. When the system load is 50ms, it decreases from 100% load to 10% load, and increases from 10% load to 100% load at 250ms. When partial load is discarded, the bus voltage recovery time is only about 104ms, and the maximum bus voltage jitter is 10.87V. The system dynamic response characteristics are excellent.

There is a control method of us in 2022[1]. There is a preprint in 2024.

### III. DISCUSSION 2

$$i_{ref1} = i_L + i_c + i_v - i_{ZVS} \quad (6)$$

$$i_{ref2} = 2i_L - i_{MOS} - i_{lr} \quad (7)$$

The above formula means that to compare the ZVS-Boost converter, the freewheeling/flyback diode branch current  $i_{ZVS}$  of the resonant circuit needs to be subtracted from  $i_{ref1}$ . The current  $i_{lr}$  of resonant inductance needs to be subtracted from  $i_{ref2}$ .

The amplitude of the PWM input signal should match the amplitude of the carrier.

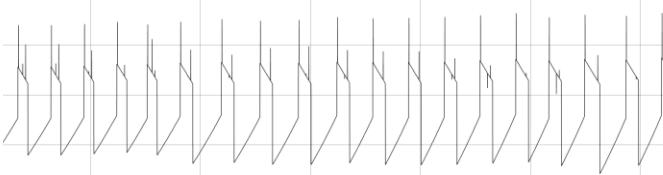


Fig. 5. Input side signal of PWM generator without  $i_{ZVS}$  in transient process.

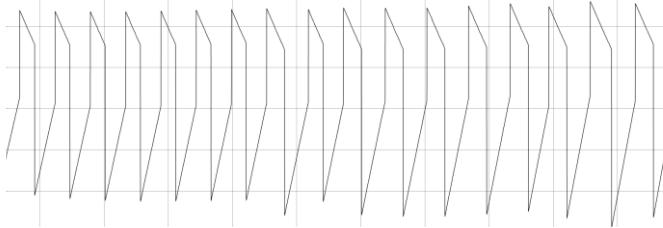


Fig. 6. Input side signal of PWM generator with  $i_{ZVS}$  in transient process.

### REFERENCES

- [1] Xu Qinghan, Meng Xianhui, Yang Ling, Ye Meiting, He Jianglun. NF+QPR+LPF Dual-Loop Secondary Harmonic Current Suppression Method for Energy Storage System in DC Microgrid. Transactions of China Electrotechnical Society, 2022, 37(20): 5188-5200.
- [2] He Jianglun. A control method of Boost converter [Z].chinaxiv,2024.